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LOCAL CONTENT IN THE PETROLEUM INDUSTRY — MEXICO

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“Local Content in the Petroleum Industry — Mexico”

1. Introduction

This paper describes the most relevant aspects of the former and current national content policy for the hydrocarbons sector in Mexico. This policy was initiated in 2008 as a result of a legislative reform that required the national oil company, *Petróleos Mexicanos* (Pemex), to establish mandatory provisions regarding the inclusion of obligatory state requirements to include local content in its contracts. Before 2008, no local content requirements were considered mandatory. The reform resulted in the issuance in 2009 of the Strategy for Developing Suppliers, Contractors and National Content, which was implemented between 2010 and 2014. More developments followed as a result of the 2013 reform, which established mandatory local content requirements for all companies partaking in exploration and production activities, although local content requirements for deep and ultra deep-water¹ operations would not contribute to the fulfilment of the overall national content goals in the Mexican hydrocarbons industry between 2025 and 2035. Thus, this chapter will provide an overview of the legislative and institutional establishment of local content policy in Mexico and discuss some of its salient and economic implications.

2. Policy and Baseline

Policy Background, Including Short- and Long-Term Goals

Since its nationalization in 1938, Pemex had been the only oil and gas company operating in Mexico. As a national oil company, its finances were closely intertwined with those of the public sector, and Congress would pass laws that provided Pemex with relevant roles other than maximizing its added value.

As described in further detail later in this paper, local content policy was formally introduced into legislation for the oil and gas industry in November 2008. The Mexican Congress passed legislation requiring Pemex to increase its local content level by 25 percent through a strategy that would include mandatory local content requirements in its contracts and also propose a program to enhance its suppliers and contractors' capacity to fulfill the needs of Mexico's oil and gas industry,² in particular concerning upstream activities. At the time, local content was defined using one of the simplest methodologies of imported value minus total value of the project, divided by the total value of the project. Also, the legislation ordered that *Nacional Financiera* (NAFIN), the national development bank, would create a trust fund to channel public funds to programs intended to strengthen the national oil and gas supply chain. Pemex had 180 days to publish a strategy that included an estimate of its local content baseline in order to propose specific targets.

On May 26, 2009, Pemex published its Strategy for Developing Suppliers, Contractors and National Content (the Strategy). The baseline was 35.1 percent, as will be described with greater detail later in this paper, and the target was to increase local content by 25 percent

¹ Ultra deep water drilling consists of drilling wells deeper than 1,000 meters below sea level.

² "Ley de Petróleos Mexicanos," Thirteenth transitory article, Federal Official Gazette, November, 28, 2008.

in 10 years—growing from 35.1 percent to 43.8 percent between 2009 and 2019.³ Pursuant to this policy, the company is required to inform the Mexican Congress of its progress on local content indicators. As part of the Strategy, all of the company's actions and initiatives needed to be aligned, with the main objective of maximizing value in Pemex. That is, local content should bring value added to Pemex, as well as enhance the development of local industry and suppliers.

The 35.1 percent local content baseline⁴ was calculated through analyses, which was derived from the estimated production of national companies in the three segments that contributed to Pemex's spending in goods, services, and public works. Policies implemented in Norway and Brazil were taken into consideration when looking at best practices. Since 2003, Brazil has developed a very detailed mechanism for measuring local content, including using an exhaustive carnet or *cartilha*, which was not applicable to Pemex's requirements because it was considered to be cumbersome and difficult to update. On the supply chain development side, Pemex chose to embrace a methodology that appeared to be more practical and comprehensive. This methodology projected Pemex's future demand for the next five years, then assessed the production level and competitiveness capacity of local providers to satisfy Pemex's demand in order to identify the gaps between oil and gas goods and services demand and competitive supply at a national level. Once gaps were clearly identified by a steering committee, whose structure will be more amply explained in the "Overview of key local conditions" section, the aforementioned trust fund—namely FISO Pemex—would be used to strengthen the capacity of national companies, providing higher levels of competitive local content.

The working group in charge of estimating the baseline had to define an indicator and targets for increasing local content. Assessments of available local content of goods, services, and public works purchased by Pemex were conducted, and a global total of 35.1 percent was established as the baseline. Of that, 25 percent equaled 8.8 points of local or national content, and a period of 10 years was set as a reasonable term to attain the targeted increase, moving from 35.1 percent to 43.9 percent between 2009 and 2019. Also, this group was in charge of establishing the formula by which the local content of a project would be equivalent to the total value of the project minus its imported value, divided by the total value of the project. This was considered to be the simplest formula and thus, the best one with which to start.

³ "Estrategia de Petróleos Mexicanos para el Desarrollo de Proveedores, Contratistas y Contenido Nacional," May 26, 2009. Retrieved from: http://www.pemex.com/procura/Documents/desarrollo_proveedores_0907101.pdf.

⁴ Mexican local content should be analyzed in two tracks, one focused on local content mandatory requirements in contracts, and the other concerned with estimating, registering, and measuring local content in Pemex as a whole. The first track was always referred to as "local content" (as in requirements), whereas the second one purposely was referred to as "integrated local participation" or "integrated local content." In different documents, one or the other may be found.

In order to comply, the Pemex internal regulatory framework established local content requirements for *every* Pemex purchase. However, the North American Free Trade Agreement, signed by Canada, Mexico, and the United States in the early 1990s, stated in the chapter concerning government procurement that no partner country could legally impose local content requirements except for “major integrated projects”—fixing a cap of 25 percent for capital intensive projects and 40 percent for labor intensive ones.⁵ Traditionally, the Secretariat of Commercial Affairs had equated “major integrated project” to “public works.” Thus, during this period Pemex used local content requirements in its public works contracts, and different percentages would be defined for each, depending on the standardized project’s components. Whenever bids involved Mexico’s commercial partners, local content requirements would be under 40 percent. In other cases, requirements could be higher, if Pemex had information regarding the local capacity to meet them.

Each year, Pemex reported its local content indicators to Congress. As previously mentioned, the 2009 baseline was 35.1 percent, which was obtained based on estimates of integrated local participation in the three components of its purchases—goods, services, and public works—for 2006–2008. For goods, integrated local participation was estimated at 18.6 percent based on a representative sample that was analyzed for the period. For services, two different criteria were added: services hired through domestic bids, and services with national companies or in national currency; this was estimated at 22.6 percent.

Public works represented a higher challenge due to the sophistication of the procurement process in infrastructure projects. Twenty-nine standardized or “type” projects were defined, including upstream and downstream, and the analysis was based on projects that had been built between 2004 and 2008. Integrated local participation was estimated at 52 percent.

Once partial estimates were ready, they were weighted depending on the total expenditures Pemex dedicated to each type of procurement process—18 percent of total expenditures for goods, 38 percent for services, and 44 percent for public works. This is how the 35.1 percent baseline was established. Each year, this same methodology would be replicated to estimate integrated local participation in Pemex, using a three-year moving average in which the most recent year estimate would be substituted for the oldest year estimate, as depicted in the following chart.⁶

⁵ Tratado de Libre Comercio de América del Norte (NAFTA), Chapter 1006.

⁶ Petróleos Mexicanos, “Second quarterly report 2014 in compliance with Article 71 (párrafo primero),” Ley de Petróleos Mexicanos (Pemex Law), p. 79.

Figure 1. Integrated local participation in Pemex (three-year moving averages)

	2006-08	2007-09	2008-10	2009-11	2010-12	2011-13
Pemex consolidated	35.1%	35.6%	38.7%	40.5%	41.5%	41.6%
Goods	18.6%	23.3%	29.9%	37.8%	43.1%	45.7%
Services	22.6%	22.7%	29.1%	35.2%	37.4%	38.2%
Public Works	52.0%	50.4%	48.4%	46.6%	45.5%	44.1%

Source: Strategy for Developing Suppliers, Contractors and National Content, Pemex, May 2009.

Traditionally, an efficient mechanism to develop suppliers in any industry is to provide long- term contracts. Due to its former legal framework, Pemex could not ensure that companies that participated in its Supplier and Contractor Development Program could be hired if they produced positive results in terms of improved performance and efficiency. This happened because as a national oil company, Pemex was treated as other public sector entities, and must buy everything through public bids according to the acquisitions law. Pemex's new procurement organizational structures and rules had to be amended to fix this gap.

Overview of Key Local Conditions, Such as Industry Capacity, Existing Infrastructure, Welfare System, and the Competency of the Human Resource Base

The Strategy was designed by four working groups: demand analysis, supply characterization, local content definitions and indicators, and a financial working group that would make sure that the trust fund was established 90 days after the law was published and included revolving funds or credits, as well as subsidies. Initially, the demand analysis group was focused on better understanding Pemex's expenditures and identifying critical resources. These were defined as resources purchased in a voluminous, regular, and stable fashion due to low estimated levels of local content.

These were used as examples on how to determine gaps between demand and supply. Shortly after the local content law was published, the Inter-American Development Bank started providing consulting on the supply side analysis⁷ and helped Pemex launch a poll among its suppliers. A very complete and rounded questionnaire was published online, and Pemex's CEO sent a personal letter to an important set of companies asking for their collaboration. A total of 4,025 companies participated and provided considerable insight regarding their biggest challenges in becoming suppliers to Pemex or in increasing their supplied volumes. Focus groups were created to gain a more complete understanding of the companies' views. Supply analysis was complemented with an input-product analysis

⁷ "Estrategia de Petróleos Mexicanos para el Desarrollo de Proveedores, Contratistas y Contenido Nacional," May 26, 2009, retrieved from: http://www.pemex.com/procura/Documents/desarrollo_proveedores_0907101.pdf, p. 48.

of the Mexican economy. This analysis provided an assessment of the potential participation of Mexican suppliers and contractors for works, acquisitions, and leases of goods and services, which the 2008 law required as a part of the Strategy.

The financial working group's results included recommendations for directing funds to address the major findings of the suppliers' poll, along with recommendations to renew working relationships with providers and contractors, develop new financing schemes, reinforce the installation of new capacity in the national industry, and facilitate technology development and assimilation.

By 2010, Pemex had created a new office in charge of implementing the local content policy, which was also included as a part of its business plan—the Unit for Development of Suppliers, Contractors, and National Content. Its first task was to build the company's demand forecast for the next five years, which was published in July 2011. The tool included goods and services that would be needed between 2011 and 2015 in order to operate and maintain Pemex's existing infrastructure, as well as engineering, procurement, and construction workers to be hired to build new infrastructure or investment projects. Detailed information was set up in an open platform, which individuals and companies could access after completing a registration process. Users can download information and transfer it to an Excel spreadsheet.

Part of the work of the newly created office consisted of providing support to different Pemex project contractors that needed orientation regarding the local content requirement that should be technically feasible to include in a project. The office used the same methodology used for creating the demand forecast, which included standardized projects that would be able to incorporate a certain level of local content, depending on its components. This primal local content information for some components was provided in general terms by national chambers of commerce and organizations, which offered recent information. Also, the unit created legal instruments or guidelines to be annexed in each public works contract so that different areas in Pemex would be responsible not only for the administration of projects, but also for providers and contractors in order to be able to account for the agreed upon local content. More than 20 such guidelines or attachments were offered, depending on the sort of bid that would take place (e.g., national, international under commercial agreements).

The Strategy included a five-year demand forecast with a dual purpose. On the one hand, it was aimed at supporting medium- and long-term planning efforts of companies and industries in order to be able to better serve Pemex's demand. On the other hand, it was a basic tool to define Pemex's supply chain development strategy. Critical resources, for which providers would have to be developed, were identified analyzing this demand forecast.

The demand forecast was built in two tracks. First, databases containing information Pemex had provided for the last five years regarding the goods and services it needed to operate and maintain existing infrastructure were analyzed. Average consumption of goods and services during the last five years for existing infrastructure was assumed to also be

required for the coming five years. These goods and services were summarized under families and subfamilies of resources (e.g., pipes, valves, pumps, iron) that could be analyzed or drilled down in detail during a demand forecast search.

On the other hand, projects-to-build during the coming five years were processed through computer simulators into multiple components regarding engineering, procurement, and construction. These components later were also summarized for searching purposes (e.g., basic or extended engineering hours, heat exchangers, reactors). An estimate of standardized exploration and/or drilling platforms, distillation towers, or LNG regasification plants were used for this exercise in order to foresee the amount and scope of facilities and materials Pemex would need for the next five years, based on the number of standard projects in its investment portfolio.

Probably the main challenge during this initial stage was to establish a reasonable understanding of the supply and level of competitiveness of national providers of Pemex's critical resources. In this regard, information was scarce and inaccessible. The information, located in different agencies such as the Ministry of Commerce or the INEGI (National Institute for Statistics and Geography), was difficult to find. Also, there was pressure to enable Pemex to provide guidelines to use the funds invested in its trust fund (FISO Pemex)⁸ immediately, even if the first version of its demand forecast was not complete. This fund operated through two working groups—technical assistance, which provided subsidies, and financial support, which provided credits. Between 2009 and 2014, NAFIN (the National Financial Institution) offered \$300 million Mexican pesos (about US\$23 million) in credits to companies that had a contract with Pemex, while the technical assistance group only funneled \$40 million Mexican pesos (about US\$3 million) in subsidies through supplier and contractor development programs. Taking into account these challenges to better measuring local capacity, these programs initially were used to pay for studies on the supply of certain critical resources. Once the supply and its main challenges were clearer for certain critical resources, capacity development programs would be put in place to close those technical gaps.

During this initial period, three types of programs were launched: specific, sectorial, and regional. Under the first category, one specific company was the focus of the development program, usually a mature firm or “tractor” company, with efforts aimed at increasing the number of efficient suppliers reaching its suppliers, which were often small

⁸ Pemex's trust fund, or FISO (Fideicomiso Público para Promover el Desarrollo de Proveedores y Contratistas Nacionales para la Industria Energética), had a steering committee that would assess and compare competing funding options in order to choose the ones that had a better possibility of increasing the Strategy's main indicator—local content, or integration of Pemex's purchases. This governance body included 10 members, two from each of the following: Ministries of Finance (SHCP), Energy (SENER) and Commerce (SE); Nacional Financiera (NAFIN) as a development bank; and Pemex itself through representatives from its operations and financing offices. These were probably the main stakeholders of the Strategy, along with national chambers and industrial organizations, which would be the main visible counterparts that benefitted from FISO Pemex's projects.

and medium national enterprises. The first specific program included spotting and closing gaps for 107 supply chain companies within a major national energy consortium.

Sectorial programs were aimed at describing a critical resource or sector in terms of its number and size of companies; their main operational, administrative, and financial challenges; and their local content level at the time. The main beneficiary was the national chamber or industrial organization representing that sector and its affiliates. Part of the diagnosis was of interest to Pemex with regard to the companies with which it already had commercial relationships, and another part was used by the Ministry of Commerce to assess industrial development activities for the whole sector. Sectorial studies were completed for valves, six electric subsectors, pumps, and measurement instruments. Others were started for pipes and iron forging and casting.

Finally, regional programs tried to better understand Pemex's demand in a certain state or geographic region—especially regarding services, because of the strategic value of geographic localization for services needed by any upstream or downstream installation—and the local or regional supply and its capacity to meet the projected demand. Only one regional program was launched, and although it started as a FISO Pemex program, soon Pemex and Tabasco signed a cooperation agreement in which Tabasco would fund 100 percent of the study in order to include not only services but goods as well. The goal was to develop some main policy recommendations for the state government that would combine this diagnosis with local funds and programs to significantly close technical and operational gaps.

For the purpose of implementing the Strategy, three parties represented suppliers and contractors in the development program—the beneficiary (a mature company, an industrial chamber, or a state), a consultant (responsible for the deliverable, to provide the necessary information), and Pemex (which guided the working process and made sure deliverables were comparable and complementary). This was in accordance with the 2008 energy reform, which only affected the latter. Today, all companies are equally obligated to meet the requirements, depending on the project.

One of the primary obstacles⁹ toward defining and implementing these programs was having enough funds to meet the programs' timelines and milestones. Resources had to go through the Secretariat of Finance's approval system, which instructed the National Development Bank to apply funds to each program through the Ministry of Commerce's budgetary mechanisms. Additionally, some of the programs faced operational challenges when going through the complicated financial process in the midst of changing presidential administrations from 2012 and 2013. During these periods, beneficiaries lost momentum and interest, and suppliers seemed to be under the impression that the program may have stalled. However, it was sometimes difficult to establish the commercial interests that would encourage both the beneficiary and its supply chain to participate in

⁹ One other big challenge faced by the Strategy during its implementation, was to be able to measure, register, and follow up on real data for integrated local participation, which was expected to eventually substitute estimates. Regarding verification, only the Ministry of Commerce was able to verify local content.

the program, so incentives had to be better aligned. It may have been that the companies that participated in these programs were looking for a better relationship with both Pemex and the different government entities involved in the fund, rather than seeking improvements in their operational standards, business performance, or sales.

All supplier and contractor development programs were intended to strengthen the capacity and competitiveness of domestic companies who were involved or could be involved in satisfying Pemex's demand. The other half of the Strategy was related to local content per se, believing that establishing incremental local content requirements in contracts would be the only reasonable mechanism to be able to improve local capacity.

The human resource element concerning the oil and gas value chain in Mexico is particularly complex due to several factors: the diagnosis of human resources in Mexico in general is incomplete and often contradictory as a result of inadequate and insufficient indicators provided by public authorities.¹⁰ This means that human resource issues could be considered from the very early stages of education. However, for the purposes of this chapter, it should be envisioned according to a dual dimension: on the one hand, present human resources should be considered to evaluate whether they could satisfy a local content policy. On the other, it should also be determined whether public and private entities in Mexico are already engaged in satisfying the needs of the newly created oil and gas industry after the reform. As this latter topic will be covered in the next section, the following will cover only Pemex's human resource status as it has been the only fully integrated oil and gas company in Mexico since the expropriation in 1938. It should also be noted that a part of the human capital in the Mexican oil and gas industry has come from the service companies that have been hired by Pemex.

In terms of its labor force, Pemex is one of the largest employers in Mexico and may even be the "world's largest oil company in terms of employment."¹¹ A recurrent criticism of Pemex's hiring policy concerns an apparent lack of correlation between the company's large number of employees and the company's productivity. However, no official report has yet been issued with empirical evidence that leads to such conclusions. With more than 110,000 employees, there seems to be a lack of proportion between labor and barrels produced and marketed. An International Labor Organization study even suggests that the "the actual number of its employees or, more accurately, 'of people on its payroll' exceeds 200,000."¹² This is because of the company's "unique" work schemes, which are among the most protective in the global oil and gas industry as a result of their very paternalistic policies toward workers.

¹⁰ Today, the undersecretary of planning of the Department of Energy has begun to compile the empirical and statistical data necessary to evaluate human resource capacity. See <http://www.gob.mx/sener/articulos/prospectivas-y-herramientas-para-el-desarrollo-de-capital-humano-en-materia-energetica-7719>.

¹¹ See Carlos Reynoso Castillo, "Industrial Relations in the Oil Industry In Mexico," International Labor Organization, 2006, p. 34: http://www.ilo.org/public/libdoc/ilo/2006/106B09_162_engl.pdf, accessed April 2, 2016.

¹² Ibid.

Furthermore, one needs to consider Pemex's retired workers, as this scheme has allowed them to leave their positions at an early age and remain, at least to an important extent, on the payroll. An ILO study estimated their number at around 55,000 in 2005, and the number may be climbing significantly, especially at a time when low oil prices may push Pemex to incentivize retirement, particularly in administrative positions that are not directly involved in production activities.¹³

As it concerns the service companies and other suppliers, there are no official aggregated numbers that signal the domestic resource base that could be used for the implementation of a local content policy. However, the size of the Pemex labor force could signal that there may be a sufficient resource base, depending on the competencies of such human capital. However, the government has yet to finalize and publish a full assessment of the human resource base, be it from Pemex or the private sector.¹⁴

3. Key Players

As the agencies and companies are mentioned in later sections of this paper, along with descriptions of their competences, this section shall only make a brief reference to the most relevant ones.

Host Governments and Their Agencies

As has been mentioned, as a result of both the 2008 and 2013 reforms, following the 2013 reform, the Ministry of Commerce has had the key competencies to implement the legislative and regulatory basis for local content in Mexico. That is, while local content is established in legislative, regulatory, and administrative provisions, the ministry is in charge of the interpretation of said framework. Thus, pursuant to the former and current legal framework, the ministry has had a leading role in setting the concrete steps for the implementation of the local content policy. As will be explained in the following paragraphs, other agencies are involved in making local content policies workable. For example, after the 2013 reform, the Department of Energy (SENER), the Treasury Secretariat (SHCP), and the National Hydrocarbons Commission (CNH) are involved in contractual drafting that must take into account local content requirements. On the financing tasks, NAFIN (the National Development Bank) is entrusted with the endowments for Pemex's local content strategy.

National Oil Company

As in the previous case, in order to avoid being redundant, it may suffice to say that before the 2013 reform, Pemex was the only entity subject to local content policy, as it held an exclusive status in the performance of the entire oil and gas value chain. As stated in previous sections, the 2008 reform created a specialized unit for the elaboration and implementation of the local content strategy as described in the policy section of this chapter.

¹³ Ibid.

¹⁴ See <http://www.gob.mx/sener/articulos/prospectivas-y-herramientas-para-el-desarrollo-de-capital-humano-en-materia-energetica-7719>.

Oil and Gas Companies Operating in the Country

Only since the 2013 reform are companies other than Pemex allowed to act as operators—as performers in all oil and gas activities—in exploration and extraction. As will be explained with greater detail in the following paragraphs, as of the latest reform, by law all oil and gas exploration and extraction activities must include a mandatory percentage of local content. As of July 2015, Mexico has had four competitive bid rounds (two for shallow waters, one for onshore projects, and one for deep water, in which several international companies participated and won blocks).¹⁵ Through such auctions, some foreign- but mostly Mexican-based companies have been awarded contracts. For the first bid round, it is notable that Sierra, the first Mexican independent oil company, won the only two contracts that were awarded out of a total of 14, in a consortia that included Talos and Premier. In the second bid round, international operator ENI won the first block, while the others were won by consortia in which Mexican companies are title holders with foreign companies. A salient example of a new Mexican company is Petrobal, which is owned by Grupo Bailleres, a domestic emporium which owns mining companies and department stores, in addition to other lines of business. In auction three, a significant number of newly created companies (86 percent) won the 25 contracts that were awarded. Thus, local content, regardless of its mandatory nature, is developing in oil and gas exploration and extraction.¹⁶ The presence of mandatory local content clauses in contracts is still under national debate. Mexican companies claim that they have a “birthright” to include their goods and services and to partake in the opportunities provided by the reform. The quality of such goods and services should be analyzed case by case, company by company to analyze whether they are qualified. Nonetheless, it should be noted that local content requirements cannot be enforced in violation of the free trade agreements in which Mexico is engaged.

Service Providers Operating in the Country

As Pemex had a monopoly for 76 years, the participation of service companies in Mexico has been significant. Service companies of all sizes and origins have been hired by Pemex. Halliburton, Schlumberger, Weatherford, and Baker Hughes are some of the notable large companies, while small, home-grown Mexican companies also hold service contracts with Pemex, such as Demar, Monclova Gas, Diavaz, and Carlos Slim’s Carso. Since the 2008 reform, these companies have been subject to the local content requirement terms mentioned in previous sections of this chapter.

¹⁵ For further information, see <http://rondal.gob.mx/104-ap-bloques/>.

¹⁶ For more detailed information concerning the round one auctions, see the National Hydrocarbons Commission website, <http://rondal.gob.mx/>. One may observe the notably high participation of Mexican companies in auction three, which involved onshore fields, while the deep-water auction was a highly diverse, although not competitive, auction. That is, several companies were awarded contracts, but most areas, save for three, had only one bidder.

4. Industry Knowledge

Research and Training Centers

The training of present and future human capital represents a great challenge, and it is linked to the broader issue of education in Mexico. In her issue brief regarding this topic, the Baker Institute's Lisa Guaqueta notes that, in order to envision a structured and productive educational policy, it is material that the country in question has “long term and stable resources for higher education.”¹⁷ However, these efforts must be grounded in robust primary and secondary education. Guaqueta argues that a holistic educational model is key toward increasing enrollment: “Energy-related degrees is also key, but it must encompass all levels of skill and job opportunities, from engineers to welders and everything in between. This must be accompanied by attention to retention strategies that will keep enrolled students motivated to complete their degrees. Schools must also focus on teaching English. The opening of Mexico's energy sector will require local talent to be able to communicate with future employers and with the world at large.”¹⁸

Further, Guaqueta notes that in order for Mexico “to meet the future demands of both Pemex and international oil companies, coordination between government actors at all levels, tertiary education institutions (including public and private universities as well as technical schools), and civil society organizations is crucial. The Mexican government should promote bridge-building between national and international universities, companies, and think tanks to contribute to human capital development in Mexico.”¹⁹

In light of the above, Guaqueta ascertains that, due to a promising market, Mexico faces the big challenge of preparing the skilled human capital for the expected projects and investments deriving from the energy reform. Thus, according to Guaqueta, Mexico “should also encourage and prepare high school students to enter STEM fields (science, technology, engineering, and math),”²⁰ as part of a strong educational foundation to enter careers in the energy sector. To be successful, Guaqueta affirms that “Mexico must address two key questions in order to realize the promise of greater employment opportunities: Does the country's current workforce have the needed skills to adequately respond to increases in production, and is the country allocating the necessary resources to respond to the demand for future skills?”²¹ These questions are beginning to be addressed as Mexico prepares the implementation of the energy reform.

¹⁷ See Lisa Guaqueta, *Education, Employment Opportunities and Energy Reform in Mexico*, Issue Brief No. 08.29.14, Rice University's Baker Institute for Public Policy, Houston, Texas, 2014, <http://www.bakerinstitute.org/research/education-employment-opportunities-and-energy-reform-mexico/>, p. 3.

¹⁸ Guaqueta, *Education, Employment Opportunities and Energy Reform in Mexico*, 2014, p. 5

¹⁹ Ibid.

²⁰ Guaqueta, *Education, Employment Opportunities and Energy Reform in Mexico*, 2014, p. 4

²¹ Ibid.

Not until the 2013 reform did Mexico begin to have a unified policy toward creating industry knowledge. In September 2014, the federal government issued the “Strategic Program for the Creation of Human Resources for the Energy Sector.”²² This document pioneers governmental efforts for issuing an official diagnosis of the educational training supply for the industry and the gaps and insufficiencies the industry may have in satisfying such needs. Furthermore, said strategic programme is aimed at stimulating nationwide action toward human resources development by funding training programs, encouraging certifications, awarding scholarships, and providing funds for oil and gas-related research projects.²³

With regard to industry knowledge, it is important to note that institutions involved in training industry experts solely served the needs of Pemex. The presence of the state-owned monopoly restricted the development of research and training centers, as the labor market in Mexico was dominated by Pemex and some of its service companies. Furthermore, the principal public institution has been the Instituto Mexicano del Petróleo (IMP), which was founded in 1965 in order to enhance the industrial transformation of the country and to strengthen the technological development of the domestic oil industry in its entire value chain. The decree by which the IMP was created established the following as its main purpose:²⁴

- Basic and applied scientific research.
- The formation of researchers.
- The promotion of scientific innovation and discoveries as well as their application to the oil industry.
- The training of workers who may perform technical or nonprofessional activities within the oil industry.²⁵

This increase in creating human capital for the oil and gas sector was spurred as a result of the energy reform, which opened the industry to private parties, be they domestic or foreign. As mentioned above, shortly after the approval of the secondary legislation, the government announced that 135,000 jobs would be created by 2018 as a result of the incoming investment brought about by the opening of the Mexican oil and gas sector. Also, a new initiative has been the Pemex corporate university, which was created to develop state of the art skills in exploration, production, and industrial transformation activities. The university was initially awarded roughly \$115 million Mexican pesos by Pemex, and it will also receive additional financing from the federal government through an endowment from the National Scientific and Technological Council (CONACYT) and the Department of Energy. The goal of the university is to achieve an enrollment of approximately 1,000 students per year.²⁶ However, as late as 2016, as of the publication of this paper, the

²² See “Programa Estratégico para la Formación de Recursos Humanos en Materia Energetica,” <http://www.gob.mx/sener/acciones-y-programas/programa-estrategico-de-formacion-de-recursos-humanos-en-materia-energetica-pefrhme-7732> (accessed February 2016).

²³ Ibid.

²⁴ See <http://www.gob.mx/imp/que-hacemos> (accessed January 2016).

²⁵ Ibid.

²⁶ See <http://www.gob.mx/sener/articulos/prospectivas-y-herramientas-para-el-desarrollo-de-capital-humano-en-materia-energetica-7719>.

university's progress has been very limited, as it has only offered short courses and diplomas but has yet to establish fully developed degree-granting programs.

Courses, Degrees, and Specializations Dealing with Oil and Gas

Many institutions have been involved in the development of industry knowledge. The most prominent of them is the Universidad Nacional Autónoma de México (UNAM), which is the main institution that offers degrees in petroleum engineering, earth sciences, geophysics, and other oil and gas-related fields. Other relevant institutions are the Instituto Politécnico Nacional (IPN), which is also a publicly-owned academic institution that has provided research and technical innovation to Pemex. Also worth mentioning are the Instituto Tecnológico de Monterrey and the Universidad Autónoma de Nuevo León, which also form part of a growing cluster of private and public institutions that account for Mexico's current industry knowledge. Aside from the above mentioned institutions, there is a growing number of educational organizations that are increasingly becoming interested in developing human capital for oil and gas activities.

5. Legislative Hydrocarbon Regime Concerning Local Content

a) Regulatory Bodies (Including Functions and Roles)

The main regulatory body for local content is the Ministry of Commerce.²⁷ Pursuant to Article 46 of the Hydrocarbons Law, the Department of Energy, with the opinion of the Ministry of Commerce, shall determine local content targets depending on the nature of such operations and shall include those requirements in the applicable contracts or entitlements.

It is important to note that there are two main instruments governing oil and gas exploration and production activities. The first group are the so-called “entitlements,” which can only be awarded to Pemex or to any other state-owned company, devoid of any competitive process. The second group includes contracts, which may be awarded either to Pemex or to any other company partaking in these activities. The latter may only be awarded through a competitive process.

To determine local content, the Ministry of Commerce will establish the methodology to be applied in the entitlements and contracts for E&P activities. The agency will verify compliance with such negotiations based on the requirements thus established in the applicable rules and regulations. Said methodology shall consider the following:

1. Goods and services hired, regarding their origin.
2. Qualified local labor work.
3. Training of local labor work.
4. Investment in facilities (infrastructure) at the local and regional levels.
5. Technology transfer.²⁸

²⁷ Article 18 of Hydrocarbons law, Federal Gazette, August 11, 2014.

²⁸ Ibid.

Should the aforementioned Secretariat consider that a contractor or an entitlement holder²⁹ has not complied with local content requirements, it shall inform the National Hydrocarbons Commission (the agency in charge of these instruments), which will issue a fine for the violation in accordance with the terms agreed upon in the contract. For the purpose of verifying local content requirements, contractors and entitlement holders shall supply the Ministry of Commerce information regarding compliance in the activities they may perform.

The abovementioned ministry will have a specialized unit with the legal powers listed below:

1. It will monitor the strategies for industrial promotion of production chains and investment for the hydrocarbon industry.
2. It shall elaborate and publish a report of the progress in the implementation of a local content policy.
3. It will propose the methodology for the implementation of a local content policy.
4. It shall verify the compliance of the local content percentages in contracts and entitlements for the exploration and production of hydrocarbons.

The average percentage of local content for exploration and extraction activities should increase gradually from 25 percent as of 2015 to reach a minimum of 35 percent in 2025. Such a target will not be applicable to exploration and extraction in deep waters.

Other relevant regulatory bodies are the Energy Secretariat (SENER), the National Hydrocarbons Commission (CNH), and the Treasury Secretariat (SHCP), which oversee contract design, bidding, and administration. These three agencies are in charge of creating the instruments that govern oil and gas exploration and production, be it for Pemex or for other participants.

In either case, however, contractual drafting is performed as follows: SENER designs the technical and commercial design of both the entitlements³⁰ and the contracts, with the aid of CNH. The SHCP is in charge of establishing the fiscal model for both. However, as mentioned above, the Ministry of Commerce is the principal agency with the overarching legal powers to determine the specific requirements for local content for these instruments.

Further pursuant to transitory Article 127 of the Hydrocarbons Law, what used to be the Fideicomiso or FISO Pemex trust fund was transformed into a trust fund aimed at strengthening the capacity of all supplier chains dedicated to the energy industry, both in oil and gas and in electricity. This new fund is referred to as the Energy Fund, and the composition of its steering committee varies. Now, seven members will assess competing funding options—two members each from the Ministries of Finance and Commerce, and one each from the Department of Energy, the Energy Regulatory Commission (CRE), and Nacional Financiera (NAFIN) as a development bank.

²⁹ “Entitlement holder” is our translation of the term “Asignación Petrolera,” which has appeared in the various hydrocarbons laws in Mexico, including the one in place since August 2014. Pemex, or any State-owned company, can only be the holders of entitlements, which are the “licenses” that allow them to be full operators of a block or contractual area, devoid of any competitive process.

³⁰ For an explanation of entitlement holder, see *supra* note 28.

Also, the new law mandated that the Secretariat of Commercial Affairs create an advisory board³¹ including members from three backgrounds—energy operators, government, and academia—to aid in developing policies to foster domestic suppliers. Two advisory boards were established, one for oil and gas and another for electricity. Insight from both should be treated as an essential input for the Energy Fund’s decision-making process. Under the new law, the Secretariat of Commercial Affairs is mandated to launch a national registry of domestic suppliers to identify their development needs.

b) Relevant Policies, Legislative Framework and Key Provisions

This section describes in further detail the regulatory framework that was initially introduced in the “Policy and Baseline” section above. As mentioned, local content requirements were established in Mexican legislation as part of the 2008 energy reform, with the intent of developing a larger domestic supply chain for the oil and gas industry. To that effect, at the time the 2008 reform was approved, and as Pemex still maintained exclusivity in oil and gas operations, the sole regulatory framework regarding this matter was the Pemex Law (*Ley de Petróleos Mexicanos*) of 2008³² and the administrative provisions issued by the Pemex board of managers (*Consejo de Administración*). This means that, while the legislative basis of the local content requirement was narrow, other administrative provisions were issued to include it in Pemex’s exploration and production service contracts.³³

In this legal framework, local content requirements were mentioned in transitory Article 13 of the Pemex Law. In Mexican law, transitory articles are included as a final section of the code in order to establish obligations and terms for implementation. In the aforementioned transitory article, it is mentioned that the government had to issue a document titled “Strategy of Petróleos Mexicanos for the Development of Mexican Suppliers,” which was issued by Pemex itself. The Strategy aimed to coordinate diverse measures in order to strengthen Mexican entrepreneurship while increasing the demand for domestic goods and services, as follows:

- The Strategy set a goal to increase international content by a minimum of 25 percent, while establishing a timeline of 20 years to achieve said goal. The Strategy emphasized the participation of small and medium ventures.
- For the proper execution of such strategy, Pemex and its former subsidiary companies must issue a yearly plan for acquiring these ventures.

³¹ Article 125 of the Hydrocarbons Law.

³² Ley de Petróleos Mexicanos (Pemex Law), Federal Official Gazette, August 11, 2008.

³³ The Mexican oil and gas industry was completely open to private investment until its nationalization in 1938, when the Constitution barred the exploitation of hydrocarbons by private parties by way of concessions. However, it allowed some contracts to be in place, as well as concessions for midstream and downstream activities. Attempts to widen the participation by way of legal reforms of private investment were made in 1995, which allowed private parties to partake in the import, transport, storage, and distribution of natural gas. These reforms were successful but with minimal results, as Pemex remained dominant. Then, under the presidency of Felipe Calderon (2006-2012), there was a limited reform in 2008, which allowed companies more flexible service contracts, though these were commercially fairly unpopular. Only around 21 of such contracts are in place today. The decline of more than 25 percent of Mexico’s oil and gas production from 2004 to 2012 brought about the notable 2013 reform, which liberalized the entire Mexican oil and gas value chain.

- These transactions are subject to the financial support of the Productive Chain Program provided by *Nacional Financiera*, the abovementioned state-owned development bank.

Further, Article 53 of the above cited law, which refers to the previously mentioned administrative provisions, established the following with regard to the Pemex service contracts that were issued before the 2013 reform:

- Pemex was obligated to include minimum percentages of local content in its contracts from 2013 on. For such purpose, Pemex was also required to grant preference to bid proposals that included domestic labor, goods, and services pursuant to the rules issued by the board of managers.
- Contractual requirements are also to follow the Pemex strategic business plan, which included an assessment of the potential participation of Mexican suppliers and contractors for works, acquisitions, and leases of goods and services. Such assessment must include quantitative local content goals to be achieved on a yearly basis.
- Such requirements must be without prejudice to the trade agreements entered into by Mexico.

The 2013 reform, which opened oil and gas activities to private participation, kept many of the features that had already been established by the legal framework approved in 2008. However, as the Pemex monopoly was dissolved, so did the legal framework that governed it. For the new model, local content policy, which formerly was governed solely in the Pemex Law, was established in the new Hydrocarbon Law and also the new Pemex Law for its services contracts.

Pursuant to the Hydrocarbon Law, local content is divided into two groups. The first comprises the Pemex “entitlements” (“asignaciones”).³⁴ The second is contracts. Such entitlements are the legal instruments which permit Pemex to perform exploration and productions activities, devoid of any competitive process. These entitlements may have been retained as a result of Pemex’s request in the so-called “Round Cero” procedure³⁵ or else may be granted in the future by the Department of Energy, if the latter deems so convenient.

Thus, the legal framework for contracts and entitlements for exploration and production activities is established by Article 46 of the Hydrocarbons Law, as follows: “the sum of activities of exploration and production of hydrocarbons, performed in national territory, be they by means of entitlements or contracts, shall reach, as an average, a minimum of 35 percent of local content.” The target in this article does not apply to deep or ultra deep-water operations. Contractors and entitlement holders are obligated to comply individually and progressively with a minimal local content requirement. Such a progression shall be

³⁴ Entitlements are regulated from Articles 6 to 10 of the Hydrocarbons Law.

³⁵ Round Cero was the process in which Pemex was given the right of first refusal to choose among the fields that were already in production or had received significant investments. Further information may be found in <http://www.ri.pemex.com/files/content/No.%203%20Res.%20Ronda%200%20y%20Ronda%201.pdf>.

included in a compliance program outlined in such contracts and entitlements that will establish the applicable phases and terms.

c) Relevant Contracts

In Mexico, in this new stage after the 2014 energy reform, local content requirements have been mainly established in exploration and production contracts for oil and gas, as the Hydrocarbon Law only refers to such transactions. These local content requirements are established by the Ministry of Energy, with the opinion of the Ministry of Commerce, according to each contract's technical profile and taking into consideration the national assessed capacity for each profile. All companies signing exploration and production contracts should comply with local content requirements, which are not negotiable.

Pursuant to such law, the Mexican government may enter into the following contracts in which local content requirements are mandatory, as mentioned in the previous section of this chapter regarding legislation:

1. Licence contracts, which entitle the operator to the property of the oil and the wellhead, in exchange for the payment of bonuses, royalties, and taxes to the Mexican government.
2. Production sharing contracts, which entitle the operator to a percentage of the barrels produced.
3. Profit sharing contracts, which entitle the contractor to a share of profits following the sale of the barrels.
4. Service contracts, which may entitle the contractor to a specific fee for works and services performed or to a fee per barrel produced.

As mentioned above, it would have been important to exclude deep-water and ultra deep-water activities from these targets, but the government established a maximum of 8 percent for such activities.

6. Positive and Negative Experiences/Expectations Regarding Previous or Existing Regulatory Framework

Supply chain development and local content policy are allegedly aimed at building capacity for companies operating in a country with an important natural resources base. Traditionally, the economic value of the oil and gas sector stemmed from the production and commercialization of hydrocarbons. More recently, an additional perspective was incorporated to the commercial approach—the supply chain may bring additional value to the energy industry as a whole.

Development initiatives for providers and contractors should be central in policies in which local content requirements act as a lever in a broader strategy. Core activities of such a policy include identifying the energy industry's future demand; planning for national enterprises to take part of the future supply chain; and funnelling public resources, financing, and policy design to foster local participation on an efficient and competitive

basis. One of the most salient challenges of this strategy is keeping the balance between local content requirements enforcement and efficient supply chain development. Economist Dani Rodrik established 10 design principles for industrial policy. Among them, we may find some recommendations that have been incorporated in Mexico's local content framework: "Activities that are subsidized must have the clear potential of providing spillover and demonstration effects." Later on, he also states: "The authority for carrying out industrial policies must be vested in agencies with demonstrated competence." The third principle that has been present in this strategy states that "the agencies carrying out promotion must maintain channels of communication with the private sector."³⁶

The regulatory framework established in 2008 had the potential of providing spillovers to local companies that took part in or had the potential to participate in Pemex's supply chain. The ongoing partnership with the Ministry of Commerce has assured that the involved agencies have demonstrated sufficient competence in industrial development, although the energy sector may be the most recent one that has been incorporated into the Secretariat's ecosystem. Finally, joint advisory boards composed of Pemex, the Secretariat of Commercial Affairs, and the private sector have allowed open communication on this regard.

The previous regulatory framework (2008) portrayed a simple methodology for local content with only one component: imported value minus total value of the project, divided by the total value of the project. In a closed market where the Strategy was only dependent on Pemex, it was relatively easier to follow up on initiatives and indicators. Strategic decisions relied on its board of administrators and on negotiations with the Finance Secretariat in order to secure enough support for its financing and technical assistance fund. However, among challenges of the previous regulatory framework, we found: establishing a strategy and its implementation through a new office; clarifying if all or only some projects may carry local content requirements under NAFTA; proposing local content requirements on all public works contracts, both upstream and downstream; building Pemex's five-year demand forecast; and convincing companies or industrial chambers to participate in development projects in which they were not always interested.

Current laws and regulations (2014) primarily focus local content strategy on requirements in upstream contracts, but push further the definition and methodology of local content, incorporating six components: goods, services, labor, training, infrastructure, and technology transfer. Probably the biggest challenge is implementing the strategy not only with the national oil company but with all parties participating in the new oil and gas market, as well as extending all elements of the program to the electricity sector.

³⁶ Dani Rodrik, "Industrial Policy for the Twenty-First Century," John F. Kennedy School of Government, Harvard University, September 2004, p. 23-24.

7. Current Issues, Including Stability and Foreseeable Changes to the Current Framework, or Other Challenges for the Oil and Gas Companies Operating in the Country

Maybe the biggest challenge for any local content strategy is to guarantee a balance between fostering local companies in bids and contracts, inducing bidders to shift from a possible inertial lump-sum procurement strategy in order to include those local providers who offer competitive terms and conditions, while at the same time avoiding patronizing attitudes or decisions that do not strengthen local capacities but benefit local interest groups and offer higher costs to those businesses operating in the country. Local companies should be focused on exporting their goods and services, and not only aiming to be hired by the operators, subject to local content requirements.

Under the new energy reform, Mexican authorities have to make sure not only that exploration and extraction contracts include and comply with local content requirements, but that all companies operating in the sector, both upstream and downstream, report their integrated local participation every year so that the Ministry of Commerce may be able to design and implement the best policy decisions to foster national capacity. Also, it will probably be complicated to verify declared local content levels, whether through the Ministry or allowed third parties.

A coordination challenge also exists, since many counterparts take part in the Strategy: federal offices, state and local governments, industrial chambers and organizations, new regulators such as the National Hydrocarbons Commission (CNH) or the Energy Regulatory Commission (CRE), development and commercial banks, and also academic and research institutes and organizations.

It should also be stressed that for the past 10 years, Brazil has been a major reference for local content policy, supply chain strengthening, and capacity building for the oil and gas industry in development countries. In recent years, corruption scandals, inefficiencies in training programs, climbing costs, and other developments inside Petrobras' management have raised questions about the real impact of its strategy. It will be interesting to follow up on these events.

Probably the biggest strength of the current framework is its decision to learn from past experience and to make sure that the supply chain and local content development is an intrinsic and positive aspect of the energy reform.

8. Conclusion

As seen throughout this chapter, local content policy in Mexico is fairly new and has already gone through major changes in a relatively short time. When it began in 2008, it was born in a much more nationalistic climate in which Pemex was the sole party with the hope that Pemex itself could serve as a giant lever of industry development for Mexican procurement of all sorts of suppliers of goods and services. This first thrust toward a local content policy was in the middle of the 2013 reform, which opened the industry in its broadest scope. The question is now: is a local content policy compatible with an open market? Will it lead to paternalism, to corruption, to “crony capitalism”? Mexico is a country in which, under a weak rule of law, Pemex and the federal government could be parties to implementing a local content policy that could in fact weaken Mexico’s competitiveness, or otherwise such policy could turn into a mere simulation, should private companies reject it due to scaling costs.

That this should not happen largely depends on the true competitiveness of Mexican companies and suppliers. If the laws are applied to boost Mexican industry, lower costs, and make Mexican industry prepared to extend beyond Mexican boundaries, the true purpose of local content policy (which is industry development) may be a success.

Further, it is worth noting that Pemex, the largest contractor of local companies, is facing a very dire financial situation. Recent figures show that Pemex owes contractors (domestic and international) more than US\$10 billion. Has Pemex’s financial demise been caused by poor procurement policies? Will mandatory local content targets improve or worsen this situation?

At this point, as mentioned previously, four exploration and production auctions have taken place in Mexico, and it is worth noting that Mexican companies have participated rather actively in all four. In the first auction, which was deemed unsuccessful by the industry at large, the consortia of Sierra Oil and Gas, Talos, and Premiere won two contracts out of 14, with the first being one of the first Mexican-based operators since the expropriation. The second auction also had significant local participation as Petrobal and E&P Hidrocarburos y Servicios, both Mexican newcomers, along with their foreign partners, won two out of the three contracts, while the remaining one was won by ENI. Auction number three was clearly directed, but not exclusive, to Mexican companies. Small Canadian ones also received awards. This auction is a clear example of the risks posed by supposedly competitive processes that were tailor made for tiny Mexican companies. Initially, all 26 contracts were awarded, with very high additional royalties bid by the companies. It is a concern that companies may overbid to win the contracts with the expectation of renegotiating in the future, although it is explicitly prohibited in the contracts. Later, six companies refused to sign their contracts and the second runners-up took were awarded the bids in their place. Most of these companies are domestic, small, and inexperienced to be operators. It is yet to be seen if they will meet their development and production commitments. If they don’t, it may be a clear signal that protectionist measures do not contribute much to the development of an industry.

Auction four was quite the opposite, as it was designed to attract large international companies, with the exception of Pemex, which joined Chevron in a consortium, and Sierra Oil and Gas, which is small but participated in a consortia with PC Carigali and other companies. In the latter case, these companies initially are subject to 3 percent local content but must increase it to 10 percent over the course of most of the duration of the contract, which is of a minimum of 35 years. The methodology is still under development by the Secretariat of Commercial Affairs, so it is still uncertain how it will be implemented.

As of today, it is still too early to assess the advancement of the current local content policy, as the latest reform is still in a very early stage of its implementation. Also, this policy is subject to be implemented differently if in the upcoming 2018 elections a party with a distinct vision of local content should come to power. Come what may, Mexican industrialists will continue to look for opportunities to develop markets, be it with Pemex or with the new private investors.